

recover the species. Recovery is achieved when the decline of a species is arrested or reversed, threats to the species are neutralized, and thus, the species' long-term survival in nature is assured.

Recovery is equivalent, at a minimum, to the requirements for delisting a species under FESA and CESA. Certain species, such as anadromous fish, have threats outside the geographic scope or purview of the CALFED Program (i.e., ocean harvest regulated by the Magnuson-Stevens Act). Therefore, in some instances CALFED may not be able to complete all actions potentially necessary to recover the species; however, CALFED will implement all necessary recovery actions within the ERP Ecological Management Zones. For other species, CALFED aims to achieve more than would be required for delisting (e.g., restoration of a species and/or its habitat to a level beyond delisting requirements). The effort required to achieve the goal of "recovery" may be highly variable between species. In sum, to achieve a goal of "recovery" implies that CALFED is expected to undertake all actions within the ERP Ecological Management Zones and Program scope necessary to recover the species.

CONTRIBUTE TO RECOVERY ("r"): For species designated "r," CALFED will make specific contributions toward the recovery of the species. The goal "contribute to recovery" was assigned to species for which CALFED Program actions affect only a limited portion of the species range and/or CALFED Program actions have limited effects on the species.

To achieve the goal of contributing to a species' recovery, CALFED is expected to undertake some of the actions under its control and within its scope that are necessary to recover the species. When a species has a recovery plan, CALFED may implement some of the measures identified in the plan, that are within the CALFED Problem Area, and some measures that are outside the Problem Area. For species without a recovery plan, CALFED would need to implement specific measures that would benefit the species.

MAINTAIN ("m"): For species designated "m," the CALFED Program will undertake actions to maintain the species. This category is less rigorous than "contribute to recovery." For this category, CALFED will avoid, minimize, and compensate for any adverse effects to the species commensurate with the level of effect on the species. Actions may not actually

contribute to the recovery of the species; however, at a minimum, they will be expected to not contribute to the need to list an unlisted species or degrade the status of an already listed species. CALFED will also, to the extent practicable, improve habitat conditions for these species.

ENHANCE AND/OR CONSERVE "E": For those biotic assemblages and communities (aquatic, terrestrial, and plant) designated "E", the CALFED Program will undertake actions to maintain and enhance their diversity, distribution and abundance in the Bay-Delta estuary and watershed as appropriate to reverse their declines or to keep abundances and distributions at their present levels.

MAINTAIN AND/OR ENHANCE HARVESTED SPECIES ("H"): For those species designated "H" the CALFED Program will undertake actions to maintain the species at levels which support viable harvest rates. The goal "maintain harvested species" was assigned to species which are harvested for recreational or commercial purposes. A key to maintaining harvestable surplus levels is recognizing the need to recover, contribute to recovery, or maintain species evaluated in the MSCS. Thus, species interactions such as competition and predation and habitat needs for space and flow need to be balanced in favor of species designated for recovery, contribute to recovery and maintain. Those three designations apply only to native species and assemblages while the "maintain harvested species" designation includes some native species and non-native species. Thus, actions implemented to maintain harvested species would be expected, at a *minimum*, to not contribute to the need to list an unlisted species, degrade the status of an already listed species, or impair in any way efforts to recover, contribute to recovery, or maintain native species.

Some species, such as chinook salmon and steelhead trout, are covered by more than one strategic objective. For example, both chinook and steelhead are at-risk species and harvested species and thus covered by the objective to achieve, first, recovery and then large self-sustaining population, and by the objective to enhance fisheries for chinook, steelhead, white sturgeon, Pacific herring, and native cyprinid fishes.

Table 16. Species Designations, Species and Species Groups, Strategic Plan Goals, and Objectives.

<p>SPECIES DESIGNATION:</p> <p>RECOVERY ("R"): For those species designated "R", the CALFED Program has established a goal to recovery the species within the CALFED ERP Ecological Management Zones.</p>	
<p>Strategic Plan Objective: Achieve, first, recovery and then large self-sustaining populations of the following at-risk native species dependent on the Delta, Suisun Bay, and Suisun Bay:</p>	
<p>Delta Smelt Longfin Smelt Green Sturgeon Splittail Sacramento Winter-Run Chinook Salmon ESU Sacramento Spring-Run Chinook Salmon ESU Fall-run Chinook Salmon ESU including Late-Fall-Run Chinook Salmon Central Valley Steelhead Trout ESU Mason's Lilaeopsis</p>	<p>Suisun Marsh Aster Suisun Thistle Soft Bird's-Beak Antioch Dunes Evening-Primrose Contra Costa Wallflower Lange's Metalmark Butterfly Valley Elderberry Longhorn Beetle Suisun Ornate Shrew Suisun Song Sparrow San Pablo Song Sparrow</p>
<p>SPECIES DESIGNATION:</p> <p>CONTRIBUTE TO RECOVERY ("r"): For those species designated "r", the CALFED Program will make specific contributions toward the recovery the species.</p>	
<p>Strategic Plan Objective: Contribute to the recovery of the following at-risk native species in the Bay-Delta estuary and its watershed:</p>	
<p>California Clapper Rail California Black Rail Swainson's Hawk Salt Marsh Harvest Mouse San Pablo California Vole Riparian Brush Rabbit San Joaquin Valley Woodrat Sacramento Perch Giant Garter Snake Greater Sandhill Crane California Yellow Warbler Little Willow Flycatcher</p>	<p>Western Yellow-Billed Cuckoo Least Bell's Vireo Saltmarsh Common Yellowthroat Bank Swallow Delta Green Ground Beetle Bristly Sedge Delta Tule Pea Delta Mudwort Crampton's Tuctoria Alkali Milkvetch Point Reyes Bird's-Beak Delta Coyote-Thistle</p>
<p>SPECIES DESIGNATION:</p> <p>MAINTAIN ("m"): For those species designated "m," the CALFED Program will undertake actions to maintain the species (this category is less rigorous than "contribute to recovery).</p>	
<p>Strategic Plan Objective: Maintain the abundance and distribution of the following species:</p>	
<p>Western Least Bittern California Tiger Salamander Western Spadefoot Toad California Red-Legged Frog Native Anuran Amphibians Western Pond Turtle California Freshwater Shrimp Hardhead</p>	<p>Recurved larkspur Mad-Dog Skullcap Rose-mallow Eel-Grass Pondweed Colusa grass Boggs Lake Hedge-Hyssop Contra Costa Goldfields Legenere Heartscale</p>

Table 16. Species Designation Species and Species Groups, Strategic Plan Goals, and Objectives (continued).

<p>SPECIES DESIGNATION:</p> <p>ENHANCE AND/OR CONSERVE ("E"): For those species designated "E," the CALFED Program will undertake actions to enhance and/or maintain the diversity, distribution, and abundance of non-listed native species in the estuary and watershed.</p>	
<p>Strategic Plan Objective: Enhance and/or conserve native biotic communities in the Bay-Delta estuary and its watershed including the abundance and distribution of the following biotic assemblages and communities:</p>	
<p>Native Resident Fish Species Bay-Delta Foodweb Organisms Shorebird Guild Wading Bird Guild Migratory Waterfowl Neotropical Migratory Birds Lamprey Family</p>	<p>Vernal Pool Communities Aquatic Habitat Plant Community Group Tidal Brackish and Freshwater Marsh Habitat Plant Community Group Seasonal Wetland Habitat Plant Community Group Inland Dune Habitat Plant Community Group Tidal Riparian Habitat Plant Community Group</p>
<p>SPECIES DESIGNATION:</p> <p>MAINTAIN AND/OR ENHANCE HARVESTED SPECIES ("H"): For those species designated "H," the CALFED Program will undertake actions to maintain the species at levels that support viable harvest rates.</p>	
<p>Strategic Plan Goal: Maintain and/or enhance populations of selected species for sustainable commercial and recreational harvest, consistent with the other ERP strategic goals.</p>	
Species	Strategic Objective
<p>Striped Bass American Shad Signal Crayfish Grass Shrimp Non-native Warmwater Gamefish</p>	<p>Maintain, to the extent consistent with ERP goals, fisheries for striped bass, American shad, signal crayfish, grass shrimp, and nonnative warmwater gamefishes.</p>
<p>Chinook Salmon (all runs) Steelhead Trout White Sturgeon Pacific Herring Native Cyprinid Fishes</p>	<p>Enhance fisheries for salmonids, white sturgeon, Pacific herring, and native cyprinid fishes.</p>
<p>Waterfowl Upland Game</p>	<p>Enhance, to the extent consistent with ERP goals, populations of waterfowl and upland game for harvest by hunting and for non-consumptive recreation.</p>
<p>Artificial Fish Propagation</p>	<p>Ensure that chinook salmon, steelhead, and trout hatchery and planting programs do not have detrimental effects on wild populations of these species and ERP actions.</p>

Table 17. Basis for Selection of Species and Species Group Ecosystem Elements.

Species and Species Groups	Basis for Selection as an Ecosystem Element
Delta Smelt	The delta smelt is a native estuarine resident fish that has been listed as threatened under the California and federal Endangered Species Acts. It is a species evaluated in the MSCS.
Longfin Smelt	The longfin smelt is a native estuarine resident species and is designated as a species of special concern by DFG and a species of concern by USFWS. It is a species evaluated in the MSCS.
Green Sturgeon	The green sturgeon is designated as a species of special concern by DFG and a species of concern by USFWS. It is a species evaluated in the MSCS.
Splittail	The splittail is a native resident fish that is listed under the federal Endangered Species Act and a candidate for listing under the California Endangered Species Act. The splittail also supports a small winter sport fishery in the lower Sacramento River. It is a species evaluated in the MSCS.
Sacramento Winter-run Chinook Salmon ESU	The chinook salmon is an important native anadromous sport and commercial fish with important ecological value. The winter-run race is listed as endangered under the California and federal Endangered Species Acts. It is a species evaluated in the MSCS.
Sacramento Spring-run Chinook Salmon ESU	The chinook salmon is an important native anadromous sport and commercial fish with important ecological value. The spring-run race on the Sacramento River is listed as a threatened species under CESA and ESA. It is a species evaluated in the MSCS.
Fall-run Chinook Salmon ESU	The chinook salmon is an important native anadromous sport and commercial fish with important ecological value. The fall-run race is the largest population of chinook salmon on the Sacramento River. It is a candidate species under the ESA. It is a species evaluated in the MSCS.
Sacramento Late-fall-run Chinook Salmon	The chinook salmon is an important native anadromous sport and commercial fish with important ecological value. The late-fall-run race on the Sacramento River is a candidate species under the ESA. It is a species evaluated in the MSCS.
Central Valley Steelhead Trout ESU	The steelhead is an important native anadromous sport fish of high recreational and ecological value. The Central Valley Steelhead Evolutionarily Significant Unit is listed as threatened under the ESA. It is a species evaluated in the MSCS.
Mason's Lilaeopsis	The Mason's lilaeopsis is a State protected plant and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Suisun Marsh Aster	The Suisun marsh aster is on the CNPS 1B list. It is a species evaluated in the MSCS.
Suisun Thistle	The Suisun thistle is a federally listed endangered species and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Soft Bird's-Beak	The soft bird's-beak is federally listed endangered species and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Antioch Dunes Evening-Primrose	The Antioch dunes evening-primrose is a state and federally listed endangered species and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Contra Costa Wallflower	The Contra Costa wallflower is a state and federally listed endangered species and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Lange's Metalmark Butterfly	The Lange's metalmark is listed as endangered under the federal ESA. It is a species evaluated in the MSCS.

Table 17. Basis for Selection of Species and Species Group Ecosystem Elements (continued).

Species and Species Groups	Basis for Selection as an Ecosystem Element
Valley Elderberry Longhorn Beetle	The valley elderberry longhorn beetle listed as threatened under the federal ESA. It is a species evaluated in the MSCS.
Suisun Ornate Shrew	The Suisun ornate shrew is a species of special concern. It is a species evaluated in the MSCS.
Suisun Song Sparrow	The Suisun song sparrow is a species of special concern. It is a species evaluated in the MSCS.
San Pablo Song Sparrow	The San Pablo song sparrow is a species of special concern. It is a species evaluated in the MSCS.
California Clapper Rail	The California clapper rail is listed as endangered under the California and federal ESAs. It is a species evaluated in the MSCS.
California Black Rail	The California black rail is listed as threatened under the California ESA. It is a species evaluated in the MSCS.
Swainson's Hawk	The Swainson's hawk is listed as threatened under the California ESA. It is a species evaluated in the MSCS.
Salt Marsh Harvest Mouse	The salt marsh harvest mouse is listed as endangered under the California and federal ESAs. It is a species evaluated in the MSCS.
San Pablo California Vole	The San Pablo California vole is a California species of concern. It is a species evaluated in the MSCS.
Sacramento Perch	The Sacramento perch is a California species of special concern. It is a species evaluated in the MSCS.
Riparian Brush Rabbit	The riparian brush rabbit is listed as endangered under the CESA and ESA. It is a species evaluated in the MSCS.
San Joaquin Valley Woodrat	The San Joaquin Valley woodrat is listed as endangered under the ESA and is a California species of special concern. It is a species evaluated in the MSCS.
Greater Sandhill Crane	The greater sandhill crane is listed as a threatened species under CESA. It is a species evaluated in the MSCS.
California Yellow Warbler	The California yellow warbler is a California species of special concern. It is a species evaluated in the MSCS.
Least Bell's Vireo	Least Bell's vireo is listed as endangered under ESA and CESA. It is a species evaluated in the MSCS.
Western Yellow-billed Cuckoo	The western yellow-billed cuckoo is listed as endangered under the CESA. It is a species evaluated in the MSCS.
Bank Swallow	The bank swallow is listed as threatened under the CESA. It is a species evaluated in the MSCS.
Little Willow Flycatcher	The little willow flycatcher is listed as an endangered species under CESA. It is a species evaluated in the MSCS.
Giant Garter Snake	The giant garter snake is listed as threatened under the California and federal ESAs. It is a species evaluated in the MSCS.

Table 17. Basis for Selection of Species and Species Group Ecosystem Elements (continued).

Species and Species Groups	Basis for Selection as an Ecosystem Element
Delta Green Ground Beetle	The delta green ground beetle is listed as endangered under the federal ESA. It is a species evaluated in the MSCS.
Saltmarsh Common Yellowthroat	The saltmarsh common yellowthroat is a State species of special concern. It is a species evaluated in the MSCS.
Bristly Sedge	The bristly sedge is on the CNPS 1B list. It is a species evaluated in the MSCS.
Point Reyes Bird's-Beak	The Point Reyes bird's-beak is on the CNPS 1B list. It is a species evaluated in the MSCS.
Crampton's Tuctoria	Crampton's tuctoria is a state and federally listed endangered species and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Delta Tule Pea	The delta tule pea is on the CNPS 1B list. It is a species evaluated in the MSCS.
Delta Mudwort	The delta mudwort is on the CNPS 2 list. It is a species evaluated in the MSCS.
Alkali Milk-Vetch	The alkali milk-vetch is on the CNPS 1B list. It is a species evaluated in the MSCS.
Delta Coyote-Thistle	The Delta coyote-thistle is a State listed endangered species and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Mad-dog Skullcap	Mad-dog skullcap is on the CNPS 2 list. It is a species evaluated in the MSCS.
Rose-Mallow	Rose-mallow is on the CNPS 2 list. It is species a evaluated in the MSCS.
Eel-Grass Pondweed	The eel-grass pondweed is on the CNPS 2 list. It is a species evaluated in the MSCS.
Colusa Grass	Colusa grass is listed as a state and federal threatened species and is on the CNPS list 1B. It is a species evaluated in the MSCS.
Boggs Lake Hedge-Hyssop	The Boggs Lake hedge-hyssop is a State listed endangered species and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Contra Costa Goldfields	The Contra Costa goldfields is a federally listed endangered species and is on the CNPS 1B list. It is a species evaluated in the MSCS.
Greene's Legenere	Legenere is on the CNPS 1B list. It is a species evaluated in the MSCS.
Recurved Larkspur	The recurved larkspur is on the CNPS 1B list. It is a species evaluated in the MSCS.
Heartscale	Heartscale is on the CNPS 1B list. It is a species evaluated in the MSCS.
California Freshwater Shrimp	The California freshwater shrimp is listed as an endangered species under ESA. It is a species evaluated in the MSCS.
Hardhead	The hardhead is a California species of special concern. It is a species evaluated in the MSCS.
Western Least Bittern	The western least bittern is a California species of special concern. It is a species evaluated in the MSCS.
California Red-legged Frog	The California red-legged frog is listed as a threatened species under the federal ESA. It is a species evaluated in the MSCS.

Table 17. Basis for Selection of Species and Species Group Ecosystem Elements (continued).

Species and Species Groups	Basis for Selection as an Ecosystem Element
California Tiger Salamander	The California tiger salamander is an amphibians designated as species of special concern. It is a species evaluated in the MSCS.
Western Pond Turtle	The western pond turtle is designated as a species of special concern and a species of concern by DFG and USFWS, respectively. It is a species evaluated in the MSCS.
Western Spadefoot Toad	The western spadefoot toad is an amphibian designated as species of special concern It is a species evaluated in the MSCS.
Lamprey Family	Anadromous lamprey is an important native anadromous fish of high ecological value. The status, abundance, and distribution of anadromous lamprey is unknown.
Native Resident Fishes	Native resident fish species of the Delta are important ecologically and serve as surrogate indicators of ecosystem health. Some native species are important elements of the foodweb; others are important predators. Native resident fish have been in decline as a percentage of total fish species abundance in tributaries of the Bay-Delta/Central Valley watershed.
Native Anuran Amphibians	Native anuran amphibians are ecologically important and serve as surrogate indicators of ecological health.
Migratory Waterfowl	Many species of waterfowl migrate through, winter, or breed in the Bay-Delta. Waterfowl are significant components of the ecosystem, are of high interest to recreational hunters and bird watchers, and contribute to California's economy through the sale of hunting and related equipment.
Shorebird and Wading Bird Guild	Many species of shorebirds and wading birds migrate through, winter, or breed in the Bay-Delta. These species are significant components of the ecosystem, are of high interest to recreational bird watchers, and contribute to California's economy through sales of equipment and other bird-watching-related expenditures.
Neotropical Migratory Birds	Many species of neotropical migratory birds migrate through or breed in the Bay-Delta. These species are significant components of the ecosystem, are of high interest to recreational bird watchers, and contribute to California's economy through sales of equipment and other bird-watching-related expenditures.
Bay-Delta Foodweb Organisms	Foodweb organisms are essential for the survival and productivity of fish, shorebirds, and other higher order animal populations in the Bay-Estuary.
Plant Community Groups	Plant community groups include aquatic habitat plant communities (pondweeds with floating and submerged leaves), tidal brackish and freshwater marsh plant communities (pickleweed series, saltgrass series, bulrush series, cattail series, and common reed series), seasonal wetland plant communities (northern claypan vernal pool communities, northern hardpan vernal pool communities, inland dune plant communities (Antioch Dunes plant community), and tidal riparian habitat plant communities (black willow series, narrowleaf willow series, white alder series, buttonbush series, Mexican elderberry series, and valley oak series).
White Sturgeon	The white sturgeon is an important native anadromous sport fish with high recreational and ecological value.
Striped Bass	The striped bass is an important non-native anadromous sport fish with high recreational value. It also plays an important role as a top predator in the aquatic system.
American Shad	The American shad is an important non-native anadromous sport fish with high recreational value.

Table 17. Basis for Selection of Species and Species Group Ecosystem Elements (continued).

Species and Species Groups	Basis for Selection as an Ecosystem Element
Non-native Warmwater Gamefish	Non-native warmwater gamefishes provide abundant opportunities for recreational angling.
Pacific Herring	Pacific herring support the most valuable commercial fishery in San Francisco Bay.
Grass Shrimp	Grass shrimp support bait fisheries in the Bay.
Signal Crayfish	The signal crayfish is an introduced species that supports a small commercial fishery, as well as a sport fishery, in the Delta.
Upland Game	Upland game species are of high interest to recreational hunters in the Bay-Delta and contribute to California's economy through the sale of hunting-related equipment and expenditures.

Table 18. Ecological Management Zones in Which Programmatic Actions Are Proposed That Will Assist in the Recovery of Species and Species Groups.

[Note: Refer to Volume II: Ecological Management Zone Visions for information regarding specific targets and actions.]

Species and Species Group Visions	Ecological Management Zone ¹													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Species with the Designation "Recover"														
Delta Smelt	•	•												
Longfin Smelt	•	•										•		
Green Sturgeon	•	•	•	—				•						
Sacramento Splittail	•	•	•					•	•		•	•		
Winter-run Chinook Salmon	•	•	•	•	•		•	•	•	•	•	•	•	
Spring-run Chinook Salmon	•	•	•								•	•	•	
Fall-run Chinook Salmon (including late-fall-run)	•	•	•	•	•		•	•	•	•	•	•	•	
Steelhead Trout	•	•	•	•	•		•	•	•	•	•	•	•	
Mason's Lilaeopsis	•	•							•	•	•			•
Suisun Marsh Aster	•	•												
Suisun Thistle		•												
Soft Bird's-Beak		•								•				
Antioch Dunes Evening-Primrose and Contra Costa Wallflower		•								•				
Lange's Metalmark Butterfly	•	•												
Valley Elderberry Longhorn Beetle	•	•	•	•	•									
Suisun Ornate Shrew		•												
Suisun Song Sparrow		•												

Table 18. Ecological Management Zones in which programmatic actions are proposed that will assist in the recovery of species and species groups (continued).

Species and Species Group Visions	Ecological Management Zone ¹													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
San Pablo Song Sparrow		•												
Species with the Designation "Contribute to Recovery"														
California Clapper Rail		•												
California Black Rail	•	•		—										
Swainson's Hawk	•	•							•	•	•	•	•	
Salt Marsh Harvest Mouse		•												
San Pablo California Vole		•												
Sacramento Perch	•	•	•	•							•	•	•	•
Riparian Brush Rabbit	•												•	
San Joaquin Valley Woodrat	•												•	
Greater Sandhill Crane	•													
California Yellow Warbler	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Least Bell's Vireo	•	•	•	•								•		
Western Yellow-Billed Cuckoo	•		•									•	•	
Bank Swallow				•										
Little Willow Flycatcher				•					•		•	•	•	
Giant Garter Snake	•	•				•	•		•		•	•	•	
Delta Green Ground Beetle	•	•												